

## **WHAT IS CLAIMED IS:**

1. A thermal reactor for converting a liquid hydrocarbon fuel to a fuel vapor, comprising:
    - a cylinder defining an axial bore therethrough, the cylinder defining an inlet port adapted to receive the liquid hydrocarbon fuel, the cylinder defining an outlet port adapted to discharge the fuel vapor; and
    - at least one heating element connected to the cylinder and arranged to heat the liquid hydrocarbon fuel to convert the liquid fuel to the fuel vapor.
  2. The thermal reactor of claim 1, wherein the at least one heating element comprises a plurality of heating elements disposed in the cylinder, the heating elements arranged such that the liquid hydrocarbon fuel contacts the heating elements.
  3. The thermal reactor of claim 2, wherein the cylinder defines a side wall having a plurality of apertures therethrough, each of the apertures having one of the heating elements extending therethrough such that each heating element projects into the cylinder.
  4. The thermal reactor of claim 3, wherein each of the heating elements is generally perpendicular to the axis of the cylinder.
  5. The thermal reactor of claim 3, wherein each of the apertures has a corresponding aperture located about 90 degrees therefrom.

6. The thermal reactor of claim 3, wherein the apertures are arranged in two columns, each column being generally parallel to the axis of the cylinder, the columns being positioned about 90 degrees apart.

7. The thermal reactor of claim 1, further comprising:

5 at least one fuel bar connected to a side wall of the cylinder, the fuel bar defining at least one fuel well in fluid communication with the cylinder, the fuel well defining the inlet port such that the liquid fuel flows into the fuel well; wherein the at least one heating element is disposed within the fuel bar so as to heat the liquid fuel within the fuel well to convert the liquid fuel to the fuel vapor.  
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